

CLAIMS

What is claimed is:

1. A light emitting device comprising a laser diode and a phosphor composition positioned to receive light from said laser diode, the phosphor composition capable of absorbing light from said laser diode and emitting light at a wavelength longer than the light from the laser diode.
2. The light emitting device of claim 1, wherein the device is a white light emitting device.
3. The light emitting device of claim 1, wherein the phosphor composition comprises a first type of phosphor particles and a second type of phosphor particles, wherein the first type of phosphor particles emits red light upon excitation, and the second type of phosphor particle emits green light upon excitation.
4. The light emitting device of claim 3, wherein the first type of phosphor particles emits light having a wavelength in the range of about 590 to about 650 nm.
5. The light emitting device of claim 3, wherein the first type of phosphor particles comprises a material selected from SrS:Eu^{2+} ; CaS:Eu^{2+} ; $\text{CaS:Eu}^{2+}, \text{Mn}^{2+}$; $(\text{Zn}, \text{Cd})\text{S:Ag}^{+}$; $\text{Mg}_4\text{GeO}_5\text{F:Mn}^{4+}$; and ZnS:Mn^{2+} .
6. The light emitting device of claim 3, wherein the second type of phosphor particles emits light having a wavelength in the range of about 520 to about 550 nm.
7. The light emitting device of claim 3, wherein the second type of phosphor particles comprises a material selected from $\text{SrGa}_2\text{S}_4\text{:Eu}^{2+}$ and ZnS:Cu,Al .

8. The light emitting device of claim 6, wherein the first type of phosphor particles emits light having a wavelength in the range of about 590 to about 650 nm.
9. The light emitting device of claim 1, wherein the phosphor composition comprises phosphor particles that emit yellow light upon excitation.
10. The light emitting device of claim 9, wherein the phosphor particles emit light having a wavelength in the range of about 560 to about 580 nm.
11. The light emitting device of claim 9, wherein the phosphor particles comprise $(Y,Gd)_3Al_5O_{12}:Ce,Pr$.
12. The light emitting device of claim 1, wherein the phosphor composition is a conformal coating disposed on a surface of the laser diode.
13. The light emitting device of claim 12, wherein the conformal coating is between about 15 micrometers and about 150 micrometers thick.
14. The light emitting device of claim 1, wherein the phosphor composition is disposed on a surface of a lens positioned to receive light from the laser diode.
15. The light emitting device of claim 1, wherein the phosphor composition comprises a clear polymer matrix having phosphor particles suspended therein, wherein the clear polymer matrix is shaped as a lens, the clear polymer matrix being positioned to receive light from the laser diode and to direct light from the light emitting device.
16. The light emitting device of claim 1, wherein the phosphor composition comprises a material selected from $SrS:Eu^{2+}$ and $CaS:Eu^{2+}$.
17. The light emitting device of claim 1, wherein the phosphor composition comprises a material selected from $CaS:Eu^{2+},Mn^{2+}$ and $(Zn,Cd)S:Ag^+$.

18. The light emitting device of claim 1, wherein the phosphor composition comprises a material selected from $\text{Mg}_4\text{GeO}_{5.5}\text{F:Mn}^{4+}$; and ZnS:Mn^{2+} .
19. The light emitting device of claim 1, wherein the phosphor composition comprises a material selected from $\text{SrGa}_2\text{S}_4\text{:Eu}^{2+}$ and ZnS:Cu,Al .
20. The light emitting device of claim 1, wherein the phosphor composition comprises $(\text{Y,Gd})_3\text{Al}_5\text{O}_{12}\text{:Ce,Pr}$.
21. The light emitting device of claim 1, wherein the phosphor composition has a first peak emission wavelength in the range of about 620 nm to about 650 nm.
22. The light emitting device of claim 21, wherein the phosphor composition has a second peak emission wavelength in the range of about 520 nm to about 550 nm.
23. The light emitting device of claim 1, wherein the phosphor composition has a peak emission wavelength in the range of about 560 nm to about 580 nm.
24. The light emitting device of claim 1, wherein the phosphor composition comprises phosphor particles having a mean particle diameter in the range of about 13 to about 20 micrometers.
25. The light emitting device of claim 1, wherein the laser diode is a blue laser diode.
26. The light emitting device of claim 1, wherein the laser diode is a violet laser diode.
27. The light emitting device of claim 1, wherein the laser diode is a UV laser diode.
28. The light emitting device of claim 1, wherein the laser diode is operated in a pulse mode.